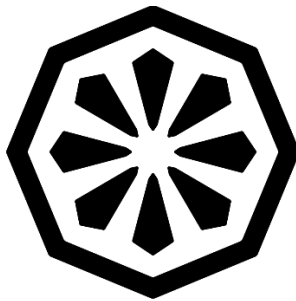




# CT50 Automatic Scrubber Operator Manual



**IPC**

BY TENNANT COMPANY

Each new CT50 model comes with this manual. This manual provides necessary machine operation and maintenance instructions. Before operating or using this machine, please read and understand this manual carefully.

How the CT50 works: Water and cleaning agent flows to the brush or pad when the brush motor is activated. When the machine moves forward, the dirty water is sucked through the squeegee hose and then into the recovery tank.

According to the following points, the best results will be achieved at the lowest cost:

Operate the machine carefully.

Regularly maintain the machine according to the maintenance instructions provided in the operation manual.

Use parts made by the original factory or the same grade for maintenance.

Parts and supplies can be ordered from your distributor or from IPC. Please call +1 800 486 2775 or visit [www.ipcworldwide.com/us/](http://www.ipcworldwide.com/us/)

Note: Prioritize recycling whenever possible and responsibly dispose of packaging materials, batteries, and old machine components. Ensure that antifreeze and other potentially harmful liquids, such as oil, are discarded in compliance with local waste disposal regulations.

Machine Data:

Please fill this section in during installation for future reference:

- Model Number: \_\_\_\_\_
- Machine Serial Number: \_\_\_\_\_
- Sales Representative Phone Number: \_\_\_\_\_
- Customer Number: \_\_\_\_\_
- Installation Date: \_\_\_\_\_

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Safety precautions:

- This machine is a commercial product. It is specifically used for cleaning hard indoor floors and cannot be used for other purposes. Please be sure to use the recommended cleaning pads, brushes, and neutral cleaning agents suitable for this machine.
- The following safety warning symbols and the "for safety reasons" title are used throughout this manual. According to their instructions, their functions are:
  - ⚠ WARNING: Used to warn of operations that may result in serious personal injury or death risks or unsafe operations.  
For safety reasons: indicate the precautions that must be followed when using the machine safely.
  - ⚠ WARNING: The following operations carry a risk of serious personal injury or death if not performed correctly. Always ensure you follow safety guidelines and precautions.
- The following safety prevention symbols indicate situations that may pose potential danger to operators or equipment. All operators must read, understand, and implement the following safety precautions.
  - ⚠ WARNING: Danger of fire or explosion
    - Do not use flammable liquids; Do not operate the machine near or in areas with flammable liquids, gases, or dust.
    - This machine is not equipped with an explosion-proof motor. During startup and operation, the electric motor of this machine may generate sparks. If used in places with flammable gases, liquids, or dust, it may cause a flash fire or explosion.
    - Do not pick up flammable materials or active metals.
  - ⚠ Warning: Danger of electric shock. Before undertaking any repairs, always unplug the battery wiring and charger plug. Never use a damaged power cord to charge the battery, and refrain from modifying the plug. If the charger's power cord is damaged, it should be replaced by the manufacturer, their maintenance agent, or qualified personnel to ensure safety.
  - ⚠ Warning: The rotary brush is running. Do not approach with both hands. Please turn off the power before repairing the machine.

## For Safety Reasons:

1. Operation Guidelines: Operate only if trained and after reading the manual. Ensure the machine is in proper working condition.
2. Before Starting: Check all safety devices for proper function.
3. During Operation: Tread cautiously on slopes and wear non-slip shoes. Slow down during turns and avoid slopes steeper than 5% (3°). Keep children away. Always dilute the detergent according to the manufacturer's instructions
4. Leaving or Repairing: Park on a flat surface, turn off, and remove the key.
5. Maintenance and Repair: Wear snug clothing and protective gear. Disconnect the battery before repairs and only use approved parts. Only qualified personnel should perform maintenance. Do not modify the machine or use high-pressure sprayers on it.
6. Transporting: Empty the water tank and remove the battery. Use recommended methods for loading/unloading. Secure the machine during transit.

Machine components:

- 1. Recovery tank cover
- 2. Recovery tank release lever
- 3. Clean water and chemical inlet
- 4. Brush cover
- 5. Guiding wheel
- 6. Brush
- 7. Rear wheels



- 8. Motor activation lever
- 9. Water flow control lever
- 10. Charger connection clip
- 11. Squeegee handle
- 12. Squeegee suction hose
- 13. Clean water filter screen
- 14. Squeegee assembly
- 15. Solution tank drain
- 16. Scrub head pedal
- 17. Recovery tank drain hose
- 18. Clean Water level indicator



19. Brush motor switch

20. Vacuum motor switch

21. Circuit breaker

22. Hour meter

23. Main power key switch



24. Vacuum motor

25. Electric control panel

26. Battery

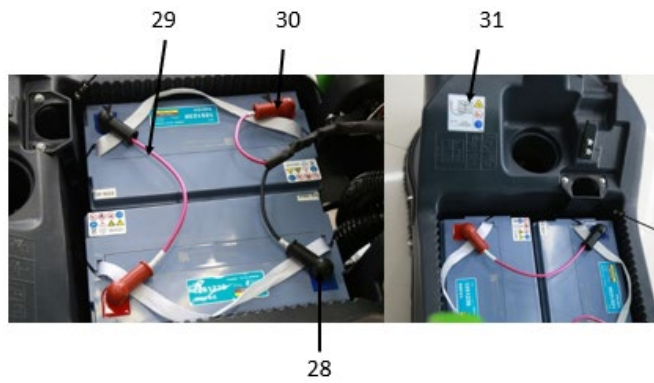
27. Clean water inlet filter

28. Power supply negative line (black)

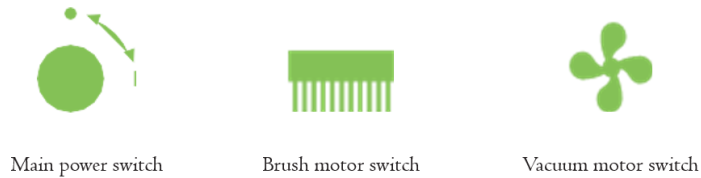
29. Battery connection cable

30. Power supply positive line (red)

31. Identification of battery connection line



### Console symbols:



### Unpacking the machine:

1. Carefully inspect the packaging box of the machine for any damage. If there is any damage, please report it to the carrier immediately.
2. Check the list of shipping contents. If there are any missing items, please contact the dealer.

### Package content:

- 2 12V batteries
- 110V, 15A intelligent charger
- 1 10-gauge wires, 36cm long battery wiring
- 4 battery terminal covers
- One squeegee assembly
- One brush and one pad driver (scrub pad not included)

Before unpacking the machine packaging, remove the metal fasteners on the large wheels first. With the assistance of others, carefully remove the machine from the pallet.

Attention: If a loading ramp is not used, do not directly push the machine to avoid damage

### Battery Installation:

Wear protective gloves and eye protection when handling batteries and battery wiring.

Suggested battery specifications:

- Two 12 V, 35Ah ultra maintenance free batteries.
- Maximum battery dimensions: 33 x 18 x 21cm / 13" x 7" x 8 1/2"

Park the machine on a level surface, turn off all power switches, and remove the key.

Lift the recovery tank so that you can reach the battery compartment. (Figure 1)

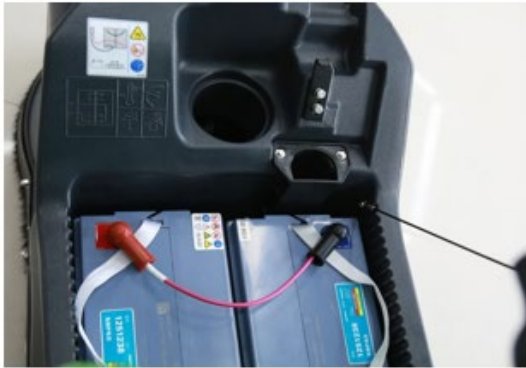


Figure 1

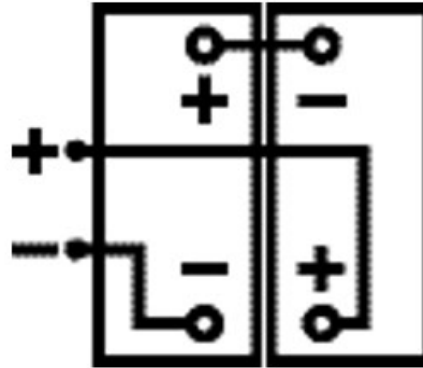


Figure 2

Carefully install the battery in the battery compartment and arrange the battery terminals. (Figure 2)

Connect the battery wiring to the battery terminal as shown in the figure (Figure 2), with the red connected to the positive pole (+) and the black connected to the negative pole (-).

#### Machine installation:

Install the squeegee components.

- Park the machine on a level floor, turn off all power switches and take out the keys.
- Pull up the lifting rod of the squeegee to the upper position (Figure 6).



Figure 6



- Install the squeegee assembly onto the squeegee installation bracket as shown in the figure (Figure 7). Be sure to fully insert the fastening knob into the slot before tightening the knob.
- Connect the suction hose to the squeegee assembly, as shown in the figure (Figure 8).



Figure 7



Figure 8

- Check the squeegee blade and make appropriate adjustments (refer to "Adjustment of squeegee blade" on page 26).

#### Installing the brush/pad driver and pad (pad not included):

For safety reasons: Before installing the brush or pad driver, please park the machine on a level floor, turn off all power switches, and remove the key.

1. Park the machine on a level surface, turn off all power and remove the key.
2. Press the brush head-lifting pedal and move it to the right (as shown by the arrow) to raise the scrub head (Figure 9)



Figure 9

3. If using pads, install the pad onto the pad driver (Figure 10).



Figure 10

- Place the brush/pad driver in the middle of the brush cover (Figure 11)



Figure 11

- Press the scrub head pedal and move left, then lower the brush head. Turn on the power, press the brush motor switch to 'on', and hold the motor handle to activate. The brush/pad will engage upon spinning. (See Figure 12)

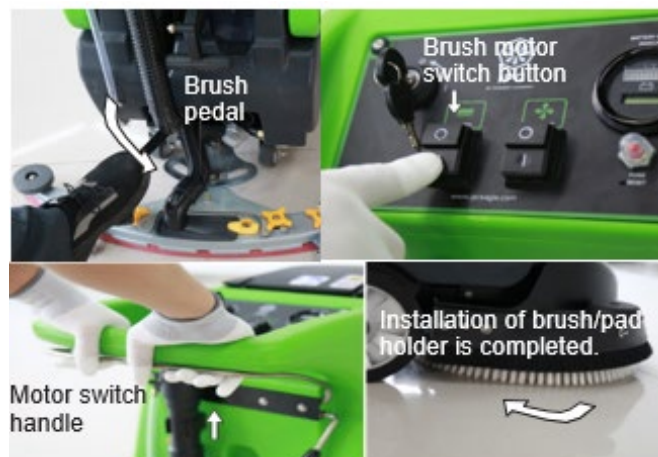


Figure 12

Pour the solution into the solution tank:

- Pour clean water and chemical into the solution tank inlet located in the front of the machine. (Figure 13).



Figure 13

- For floor washing method: Use hot water (up to 140 F or 60 °C).
- According to the mixing ratio instructions on the container, pour the recommended cleaning agent into a solution tank for mixing.

Note: If using a bucket to pour the solution into the solution tank, please ensure that the bucket is clean.

Attention: If using traditional floor scrubbing methods, please always use the recommended cleaning agent. If the machine is damaged due to improper use of cleaning agents, the manufacturer will not be responsible for the warranty.

**⚠ Warning:** Pay attention to the danger of fire or explosion, and do not use flammable liquids.

For safety reasons: When using the machine, please follow the mixing ratio and handling instructions on the chemical container.

For safety reasons: Do not operate the machine until you have read and understood the operation manual.

**⚠ Warning:** Fire or explosion danger. Do not operate the machine near or in areas with flammable liquids, gases, or dust.

#### Pre-operation inspection:

1. Check the battery level of the battery meter.
2. Check the wear of the cleaning pad/brush.
3. Check the wear of the squeegee blade.
4. Ensure that the recovery tank is empty and that the recovery water filter screen is installed and clean.

#### Starting the Machine:

- Turn on the main power switch.
- Activate both the brush motor and the squeegee motor by pressing their respective buttons (Refer to Figure I4).



Figure I4

### Machine Operation:

Press the pedal of the scrub head and move it to the left (as shown by the arrow) and raise up your foot to lower the scrub head to the floor. (Figure I7-1)

Put the squeegee down to lower the squeegee to the floor and activate the vacuum motor. (Figure I7-2)



Figure I7-1



Figure I7-2

An electronic valve will control the on/off of the water flow to the brush or pad. When the brush motor is running the electronic valve is open and water will flow to the brush or pad. When the brush motor is not running the water flow will stop. The electronic valve does not control the amount of water that flows to the brush or pad.


To control the amount of water flow to the brush or pad, raise or lower the water flow control lever to increase or decrease the water flow. (Figure I8)



Figure I8

To stop cleaning, please turn off the switches and main power of the brush motor and vacuum motor, so that the scrub head and squeegee can be lifted.

During machine operation:

 Warning: To avoid fire or explosion danger, do not pick up flammable materials or active metals.

For safety reasons: When using the machine, when encountering slopes and slippery surfaces, please walk slowly and wear anti-skid shoes.

1. Each cleaning path overlaps by 5cm / 2".
2. Keep the machine moving continuously to avoid damaging the floor.
3. Before using the machine, sweep the area to remove debris and prevent scratches. If you notice any marks on the floor after the squeegee has passed over, wipe the blade with a cloth to clear away any remaining debris.
4. Do not operate the machine on slopes with a slope exceeding 5% (3°).
5. If there is too much foam, please pour the recommended commercial defoamer into the recovery tank.

Note: Do not let foam enter the vacuum motor filter screen in the recovery tank to avoid damaging the vacuum motor.

6. For extra dirty areas, please use double scrub cleaning method to clean. Clean the area leaving the vacuum motor off and with the squeegee is in the raised position. Let the solution water soak for 3-5 minutes. Activate the brush and vacuum motors and lower the squeegee and continue to clean and recover the dirty water.
7. When the staff leaves the machine, please raise the squeegee and scrub head, turn off all power switches, and remove the key.

Battery Power Meter & Reset Switch:

## Battery Power Meter:

- The CT50 battery meter displays the battery level. When the battery is fully charged, the rightmost green light remains on. As the battery runs out, the indicator lights will light up from right to left in sequence (Figure 20).

Note: Charge the battery promptly after use, especially when the first yellow indicator light appears. Stop using the machine at this point to avoid depleting the battery. If ignored, the cleaning function will shut off at the last flashing yellow light. Then, immediately take the machine to the charging area.

## Overload reset switch:

- This machine is equipped with a resettable overload reset switch to avoid damage to the brush motor. (Figure 20) When the overload reset switch triggers a power trip, please evaluate the cause of power trip, and let the motor cool down before pressing the overload reset switch button manually. If the machine needs to be repaired, please contact the authorized service center.

### Hour Meter:

- The hour meter (Figure 20) will record the total number of hours when the brush motor is started. Please use a timer to determine when the recommended maintenance procedure should be executed and record the repair history.



Figure 20

### Draining the recovery tank:

The recovery tank should be drained and cleaned after each use.

For safety reasons: Before leaving or repairing the machine, please park it on a level surface, then turn off the machine and remove the key.

1. Move the machine to a drainage location and turn off the power key.
2. Hold the recovery drain hose with the outlet facing toward the drain and away from your face. Remove the drain hose cap and lower the drain hose to let the water out (Figure 21)



Figure 21

Note: When using a bucket for dirty water from the recovery tank, avoid using it to fill the solution tank.



3. Disassemble and flush the vacuum motor filter screen located in the recovery tank (Figure 22)



Figure 22

#### Draining solution tank:

To drain the remaining water from the water tank, please open the drain cap of the solution tank (Figure 23).



Figure 23

#### Battery charging:

The following charging instructions apply to the charger included with this machine.

Attention: To extend the lifespan of the battery, please make sure to charge the battery in a timely manner after the machine is used to prevent long-term battery loss and damage.


Battery charger specifications:

- Charger type: fully automatic smart charger
- maintenance free battery
- Output voltage: 24V
- Output current: 15Amps

#### Using the Battery Charger:

For detailed instructions on operating the battery charger, consult the accompanying battery charger manual.

Location: Position the machine in a well-ventilated area.

 Warning: Fire or explosion risk. Keep away from sparks or open flames.

Battery Installation Preparation:

1. Place the machine on a flat, dry surface.
2. Lift up the squeegee and brush plate.
3. Turn off all power switches and take out the key.

Connecting the Charger:

1. Plug the charger's AC power cord into a grounded power outlet.
2. Connect the charger's DC cable to the battery charging socket at the back of the machine (See Figure 24).

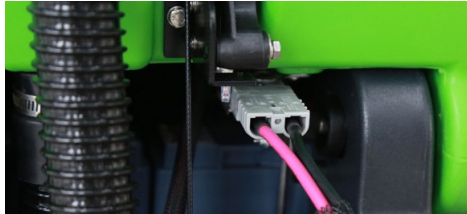


Figure 24

Note: Once the battery charger is connected to the machine, the machine is disconnected and will no longer work.

Attention: Do not unplug the DC cable of the charger from the socket on the machine during charging to avoid arc discharge. If it is necessary to pause charging during the charging period, please unplug the AC power cord first.

Precautions for installation and use of battery:

1. Before use, check each battery for damage, cleanliness, and clear markings, and clean the surface of the battery with a dry cloth. Check the open circuit voltage of the battery, whether the positive and negative poles are clearly marked, and whether there are reverse poles.
2. According to the drawing requirements, the battery should be installed upright and not upside down. The distance between adjacent batteries should be at least greater than  $\frac{1}{4}$  inch or 5mm.
3. After installation, according to the requirements of the installation drawing, check whether the positive and negative poles of each battery are correct, and then connect each battery with a whole set of wires.
4. After all the batteries are installed, check whether the connection are loose. When tightening the connection, do not overtighten.
5. When installing the battery in the machine, ensure that the battery is upright and is secure from movement within the battery compartment.
6. If storage time is more than 2 months, charge according to the charging method before use.
7. Batteries should not be close to ignition or heat sources. In hot summer, direct exposure to sunlight is strictly prohibited. Severe vibration, collision, and short circuits between positive and negative electrodes should be avoided.
8. The battery capacity is based on the ambient temperature of 77 F or 25 °C. For every 1 degree decrease in temperature, the battery capacity will decrease by approximately 1%. Temperature factors should be considered during use. Avoid use in environments below 32 degrees F as much as possible.



9. The battery should not be disassembled arbitrarily to avoid danger.
10. Waste batteries must be recycled and cannot be discarded arbitrarily, which may affect the environment.
11. When charging, attention should be paid to the temperature changes of the battery to prevent overheating, damage and danger to the battery.
12. Avoid using the batteries in a low state of charge.
13. Remember not to frequently operate the machine in low power situations, as this can easily damage the battery. The manufacturer is not responsible for any battery damage caused by this.

The working status of the LED indicator light of the smart charger:

Battery capacity	LED (red)	LED (yellow)	LED (green)
Standby	ON	OFF	OFF
Charging less than 50%	Flashes (once for 1s)	OFF	OFF
Charge 50% - 75%	OFF	Flashes (once for 1s)	OFF
Charge 75% - 100%	OFF	OFF	Flashes (once for 1s)
Full of 100%	OFF	OFF	ON

### Machine Maintenance:

To maintain the machine in optimal working condition, it is necessary to strictly follow daily, weekly, and monthly maintenance procedures. Warning: Pay attention to the danger of electric shock.

#### Daily maintenance (after each use):

- Drain and clean the recovery tank (Figure 25).



Figure 25

- Remove and flush the vacuum motor filter located in the recovery tank (Figure 26).



Figure 26

- Drain the solution tank, (Figure 27).



Figure 27

- Removing / cleaning the brush or pad: With the scrub head in the raised position, press the brush motor button to the on position, hold the motor switch handle, and immediately release it. At this time, as soon as the brush plate motor rotates and then stops, the pad driver or brush can be removed and cleaned. If there is wear, please flip or replace the cleaning pad (Figure 28).



Figure 28

- Clean the squeegee blade: Place the squeegee in the raised position to prevent damage to the blade. (figure 29)



Figure 29

- Check the wear condition of the edge of the squeegee blade (Figure 30). If there is any wear, switch the ends of the blade. (Refer to "Replacement of squeegee blades" on page 25)



Figure 30

- Use multi-purpose cleaning agents and wipe the machine with a cloth (Figure 31). For safety reasons: When cleaning the machine, do not use high-pressure spraying or water hose to flush the machine, as this may cause electrical system malfunctions.

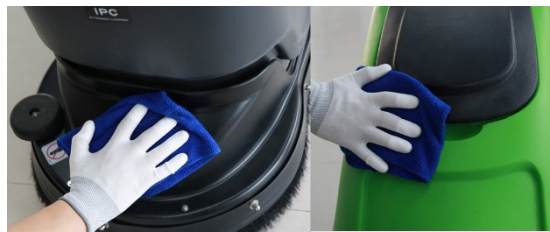


Figure 31

- To extend the lifespan of the battery, please make sure to charge the battery in a timely manner after the machine is used, to prevent damage to the battery.

#### Weekly maintenance:

- Remove the filter screen of the solution tank from under the machine and clean the filter screen (Figure 33). Ensure that the solution tank is emptied before removing the filter screen.



Figure 33

- Clean the dust from the battery compartment, check the tightness and corrosion of the battery terminals. (Figure 34)



Figure 34

- Check the cover seal of the recovery tank for foreign objects or damage (Figure 35). If there is any damage, please replace it.



Figure 35

### Replacement of squeegee blade:

Each squeegee blade has four sides. When the squeegee blade is worn, Rotate the blade to an unused side. When all 4 sides are worn then replace the blade.

1. Remove the squeegee assembly from the machine (Figure 36)



Figure 36

2. Unscrew the two yellow nuts on the outer side and screw them to the top, flip the squeegee over, and take out the blade (Figure 37).



Figure 37

2. Replace the rear blade with the other side, and then replace the blade. Ensure the direction of the clamping strip notch (Figure 38).

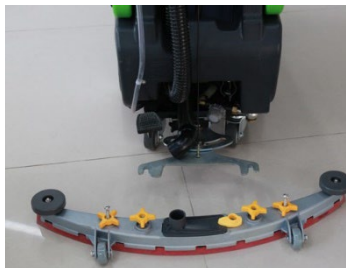


Figure 38

Adjustment of squeegee blade:

- The squeegee blade is set at the factory and usually doesn't need adjusting. Only adjust it if the squeegee gets out of adjustment.

Adjusting for brush pressure wheel:

- If the machine feels too hard to push, the brush pressure wheel's adjusting nut might be too loose. In that case, give it a slight tightening. On the other hand, if the machine doesn't go straight, the nut might be too tight. Loosen it a bit. (See Figure 39).



Figure 39

Note: The machine is preset at the factory. It's best to stick to these settings and not adjust the nut regularly. Only tweak it if you encounter the issues mentioned.

Transporting the machine:

When transport the machine with a truck or trailer, be sure to follow the following procedures:

1. Raise the squeegee and brush head.
2. Use the recommended loading dock to load the machine.
3. Place the front of the machine against the front of the truck or trailer. After the machine is stable, lower the brush head and squeegee.
4. Place an obstacle behind each drive wheel to prevent the machine from sliding.
5. Use transport straps to secure the top of the machine to prevent tilting. A bracket must be installed on the truck or trailer deck.

For safety reasons: When handling the machine, please use the recommended loading ramp for loading and unloading by truck or trailer. Use straps to secure the machine to a truck or trailer.

Storing the machine:

1. Charge the battery before storage. Do not store the battery when the battery is depleted. If the storage period is long, please ensure that the battery is charged every 2-3 months to avoid long-term battery loss and damage.
2. Drain and thoroughly rinse the water tank.
2. Store the machine in a dry place and keep the squeegee and brush plate in the raised position.
3. Open the cover of the recovery tank to facilitate ventilation.
4. Do not expose the machine to rain and store it indoors.
5. If storing the machine at freezing temperature, follow the anti-freezing instructions below.



### Anti-freezing

- Pour all 1 gallon (4 liters) of antifreeze into a solution Tank without diluting it.
- For safety: Avoid contact between antifreeze and eyes. Wear protective glasses.

Important: Before operating the machine, rinse the antifreeze in the solution tank thoroughly.

### Troubleshooting:

<u>Problems</u>	<u>Cause</u>	<u>Solution</u>
The machine is inoperable	Switch not turned on or damaged	Key on switch or replace switch
	Brush motor button not turned on or damaged	Turn on the switch or replace it
	Water vacuum motor button not turned on or damaged	Turn on the switch or replace it
	Motor switch handle malfunction	Replace microswitch
	The battery is dead or damaged	Please charge or replace the battery
	The overload reset switch trips	Eliminate short circuit faults and press the overload reset switch
Charger not working	The plug is not connected to the power supply	Check plug connection
	The positive and negative connection wires are connected incorrectly	Connect the positive and negative poles correctly
	Charger fault	Refer to the charger fault code

Troubleshooting Continued:		
<u>Problems</u>	<u>Cause</u>	<u>Solution</u>
Brush motor does not work	The brush rises off the floor or the brush motor button is damaged	Replace the brush motor microswitch
	Motor switch damaged	Replace the motor microswitch
	The overload reset switch trips	Troubleshooting, press the overload reset switch
	Motor carbon brush wear	Please contact the service center
	Loose connector of brush plate motor	Refastening the connector
	The brush motor is damaged	Replace the motor
	Casters damaged	Replace the casters
Vacuum motor does not work	The adjusting nut of the brush plate is loose	Readjust the brush plate adjusting nut
	The microswitch under the squeegee handle is damaged	Replace microswitch
	Microswitch wire falls off	Reconnect the cable head
	The motor micro button is damaged	Replace microswitch
	Damaged vacuum motor	Replace the vacuum motor
Low or no water flow	The recovery tank is full	Discharge of dirty water
	Solution tank filter screen	Clean the filter screen of the solution tank
	The water flow valve lever is broken	Replace the water valve lever
When the machine is shut down, the drain valve is closed and the water flow does not stop	Solenoid valve is broken	Solenoid Valve Replacement
	Electromagnetic valve inlet impurities	Fill the solution tank, open the water valve to its maximum, start the machine, and use water pressure to rinse the impurities in the solenoid valve. [Repeat this step a few times]
	Solenoid valve damaged	Solenoid Valve Replacement

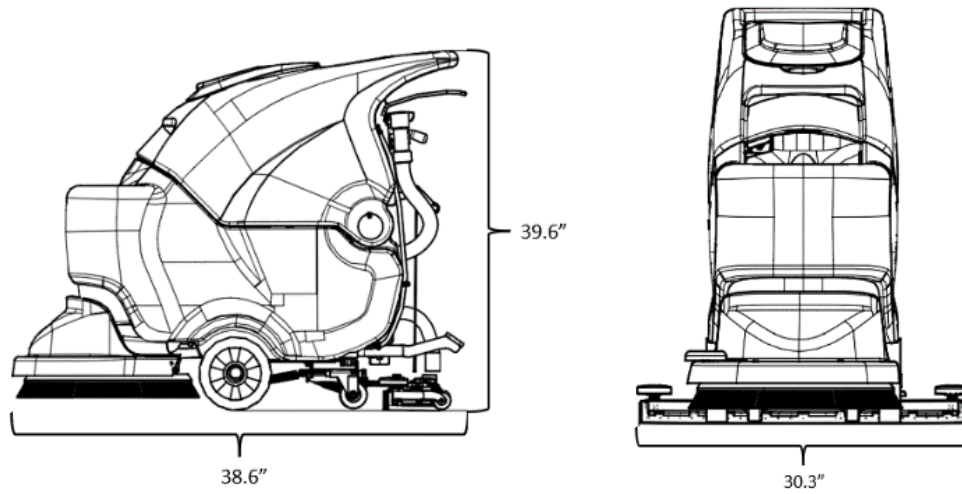
Troubleshooting Continued:		
<u>Problems</u>	<u>Cause</u>	<u>Solution</u>
Insufficient suction	The recovery tank is full or the suction hose is damaged	Drain the recovery tank or replace the suction hose
	The drain hose cap is not sealed	Replace the drain hose cap
	The vacuum motor filter screen in the recovery tank is blocked	Clean the vacuum motor filter screen
	There is a foreign object at the seal of the recovery tank drain hose cap	Remove foreign objects and replace the drain hose cap
	Wear of squeegee blade	Rotate or replace the squeegee blade
	The squeegee blade cannot be bent properly	Adjusting the height of the squeegee blade
	Damaged vacuum motor	Replace the vacuum motor
	Insufficient battery power	Charge the battery
Reduced operating time	Insufficient battery power	Please fully charge the battery
	The battery has failed	Replace the battery
	Battery needs maintenance	Refer to "Battery Maintenance"
	Battery charger malfunction	Repair or replace the battery charger

Battery charger fault codes:

Failure Mode Indication		
<b>Fault name</b>	<b>Fault description</b>	<b>Status display</b>
Battery failure	Battery voltage Too high or too low	Red, red, green, and green flashing alternately at 1Hz
	Battery error (Inconsistent use of batteries)	
Over temperature protection	Ambient temperature is too high Or the fan is not working properly	Red, Red, Red, Green 1Hz alternating flashing
Charger fault	Internal circuit fault of charger	"Red, green, red, green 1Hz alternating flashing"
Abnormal input voltage	The mains voltage is too low or too high	"Red, green, green, green 1Hz alternating flashing"



Specifications:



General machine size/capacity:

Model	CT50
Length	48.4" / 1230mm
Height	38.6" / 980mm
Width	20.9" / 530mm
Squeegee Width	30.3" / 770mm
Brush Diameter	19"
Scrubbing Width	19.7" / 500mm
Solution tank capacity	13.2 Gal / 50L
Recovery tank capacity	13.2 Gal / 50L
Weight/without battery	158 lbs / 72Kg
Weight/including standard battery components	306 lbs / 139Kg

Type:

Type	Use	VDC	KW
Electric motor	Brush Motor	24	0.50
	Vacuum motor	24	0.40

Type	Output voltage	Output current	Input voltage	Frequency
Charger (intelligent)	24VDC	15A	110V	60Hz

Type	Decibels
Noise	70dB